

US EPA ARCHIVE DOCUMENT

LITTLE TRAVERSE BAY BANDS OF ODAWA INDIANS

Emissions Inventory



Jon Mauchmar, Environmental Specialist

Treaty of Washington, 1836

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Journal of Interpersonal Violence 26(10):2009-2024, © 2011 Sage Publications

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As the City of Detroit is the State of Michigan's largest, most diverse and most vibrant city, it is the only city in the State that can provide the necessary infrastructure and services to support the growth and development of the State's economy.

Articles of agreement and commerce made and concluded at the city of Detroit in the Year a 1000 four hundred thirty five day of July year thousand eight hundred fourth, between the said company of Merchants and Henry E. Galtier Commissioner on the part of the United States and the Chippewa and Ojibwa Nations of Michigan, parties to the treaty of March 20. 1835.

In spite of the existing constraints of the Chinese and Vietnamese, and of their legal and economic status against the United States, it is agreed between the contributing parties as follows:

ARTICLE 1 The United States, its citizens and its courts are for themselves and others as similarly situated, at the present public invitation the State of Michigan and/or the following persons, to wit:

Size: 10 1/2" by 8 1/2" (approx) 200-400 pages and 100-200 photos. In the
 morning, bring the camera and film to the site. Bring 11 with you. Bring
 12 to 14. Bring 15 to 16. Bring 17 to 18.

Notes: In the Three Village Middle Village, I never could find any other Three Village, and of only six to 100 and several heard others on this route to try with them. Township 34 to 35, Township 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855,

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Legend

-  1855 Reservation
 1855 Ceded Territory
 State of Michigan
 Canada
 Lakes/Rivers
 Federal Land
 DNR Lands
 US State Boundary



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Quality Assurance Project Plans (QAPPs)

- Purpose of the Emissions Inventory (EI)
- In our case the EI was to learn about what sources are out there and track trends in pollution and air quality.
- Provide education on air quality issues to tribal residents and government.
- Evaluate the need for ambient air quality monitoring.

QAPP Cont.

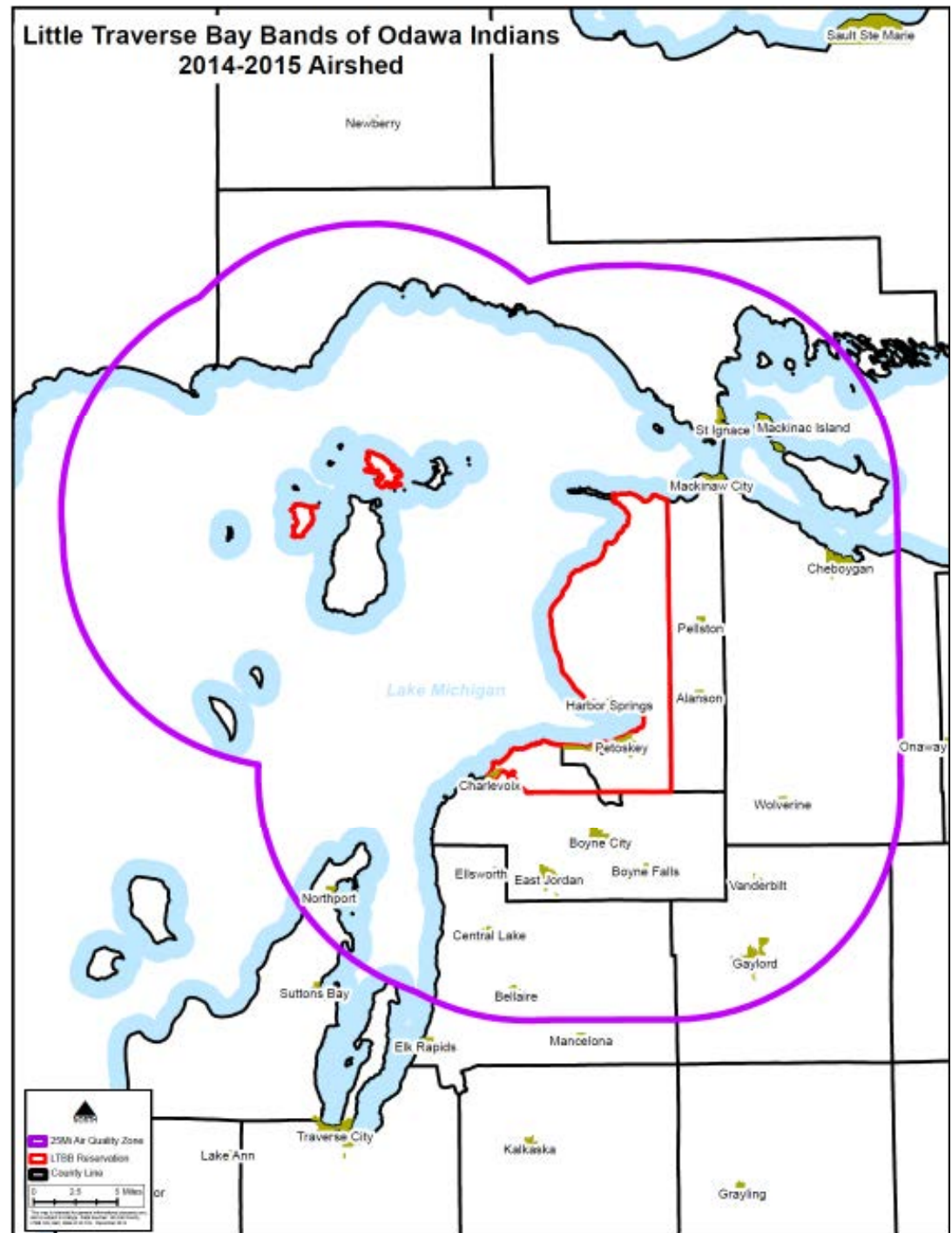
- How data will be collected (Use most recent)
- Which pollutants will be included
 - We included CO, NO_x, PM10 and PM2.5, VOCs, SO₂, Pb, and Hg (LTBB is interested in bioaccumulation in fish)
 - CO₂ was included for mobile sources (largest CO₂ contributor for our Airshed).
- Geographic area (Airshed)
 - EIs need to be tailored to the Tribe
- Checking and assuring data quality (QA/QC)
 - ITEP TAMS Center is very helpful

Planning the EI

- Geographic area to be covered by the EI.
- Work with ITEP to determine a reasonable boundary.
- Our Airshed includes the Reservation and all areas within 25 miles of the Reservation boundary.

Mostly rural

- 67% forested
- 33% agricultural and small towns



Commonly Available Data

- State Els
- National Emissions Inventory (NEI)
- There may be some difference in the State and EPA data (e.g. MI airports)
- Emissions estimated by county and listed in large spreadsheets
 - I narrowed to counties in our Airshed
 - Narrow to pollutants included in the scope

Other Data to Consider

- Percentage of Tribal citizens with respiratory issues like asthma.
- Department of transportation (how many miles of unpaved roads in Airshed?)
- Census data – I learned that our side of Michigan is growing in Population.
- Percentage of homes with wood stoves, natural gas, or propane.

How do you calculate emissions?

- You need an **emissions factor**.
 - The quantity of pollution produced in relation to the amount of raw material burned or processed.
 - There are lots of emissions factors and calculation tools available if you want to calculate emissions yourself.



f_x

26009

t 3. On-Road Emissions

		Data Category		Emissions Type			Pollutant			Total Emissions	Total Emissions
	County Name	Code	scc	Code	Data Set Short Name	Code	Description		Total Emissions	Airshed	
60	Antrim	ON	2230060130	X	2011EPAMOBILE	CO2	Carbon Dioxide		265.0710144	188.	
61	Antrim	ON	2230074210	X	2011EPAMOBILE	CO2	Carbon Dioxide		321.678009	228.	
62	Antrim	ON	2230060190	X	2011EPAMOBILE	CO2	Carbon Dioxide		53.30270004	37.8	
63	Antrim	ON	2201020150	X	2011EPAMOBILE	CO2	Carbon Dioxide		9612.009766	682.	
64	Antrim	ON	2201070190	X	2011EPAMOBILE	CO2	Carbon Dioxide		325.2229919	230.	
65	Antrim	ON	2201001130	X	2011EPAMOBILE	CO2	Carbon Dioxide		9431.139648	66.	
66	Antrim	ON	2201040150	X	2011EPAMOBILE	CO2	Carbon Dioxide		4951.649902	351.	
67	Antrim	ON	2201020130	X	2011EPAMOBILE	CO2	Carbon Dioxide		12673.09961	899.	
68	Antrim	ON	2230060170	X	2011EPAMOBILE	CO2	Carbon Dioxide		386.5280151	274.	
69	Antrim	ON	2230060150	X	2011EPAMOBILE	CO2	Carbon Dioxide		201.0460052	142.	
70	Antrim	ON	2201001150	X	2011EPAMOBILE	CO2	Carbon Dioxide		7153.180176	507.	
71	Antrim	ON	2230072210	X	2011EPAMOBILE	CO2	Carbon Dioxide		225.4929962	160.	
72	Antrim	ON	2201080150	X	2011EPAMOBILE	CO2	Carbon Dioxide		1044.420044	741.	
73	Antrim	ON	2230073190	X	2011EPAMOBILE	CO2	Carbon Dioxide		125.5230026	89.1	
74	Antrim	ON	2230074110	X	2011EPAMOBILE	CO2	Carbon Dioxide		14560.2002	103.	

SourceClassificationCodes_WebFire - Microsoft Excel

Home Insert Page Layout Formulas Data Review View

Calibri 11 A A Font Alignment Number Styles Cells Editing

Conditional Formatting Format as Table Cell Styles

Insert Delete Format Sort & Find & Filter Select

A1882 ON-ROAD

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20102011X	571			Mobile Sources	Highway Vehicles - Gasoline	Light Duty Gasoline Trucks Rural Inte
2201020130	572			Mobile Sources	Highway Vehicles - Gasoline	Light Duty Gasoline Trucks Rural Oth
20102013B	573			Mobile Sources	Highway Vehicles - Gasoline	Light Duty Gasoline Trucks Rural Oth
20102013T	574			Mobile Sources	Highway Vehicles - Gasoline	Light Duty Gasoline Trucks Rural Oth
20102013V	575			Mobile Sources	Highway Vehicles - Gasoline	Light Duty Gasoline Trucks Rural Oth
20102013X	576			Mobile Sources	Highway Vehicles - Gasoline	Light Duty Gasoline Trucks Rural Oth
2201020150	577			Mobile Sources	Highway Vehicles - Gasoline	Light Duty Gasoline Trucks Rural Mir
20102015B	578			Mobile Sources	Highway Vehicles - Gasoline	Light Duty Gasoline Trucks Rural Mir
20102015T					Vehicles - Gasoline	Light Duty Gasoline Trucks Rural Mir
20102015V					Vehicles - Gasoline	Light Duty Gasoline Trucks Rural Mir
20102015X					Vehicles - Gasoline	Light Duty Gasoline Trucks Rural Mir
2201020170					Vehicles - Gasoline	Light Duty Gasoline Trucks Rural Maj
20102017B					Vehicles - Gasoline	Light Duty Gasoline Trucks Rural Maj
20102017T					Vehicles - Gasoline	Light Duty Gasoline Trucks Rural Maj
20102017V					Vehicles - Gasoline	Light Duty Gasoline Trucks Rural Maj
20102017X					Vehicles - Gasoline	Light Duty Gasoline Trucks Rural Maj
2201020190					Vehicles - Gasoline	Light Duty Gasoline Trucks Rural Mir
20102019B					Vehicles - Gasoline	Light Duty Gasoline Trucks Rural Mir
20102019T					Vehicles - Gasoline	Light Duty Gasoline Trucks Rural Mir
20102019V					Vehicles - Gasoline	Light Duty Gasoline Trucks Rural Mir
20102019X					Vehicles - Gasoline	Light Duty Gasoline Trucks Rural Mir
2201020210					Vehicles - Gasoline	Light Duty Gasoline Trucks Rural Loc

Find and Replace

Find Replace

Find what: 2201020150

Options >>

Find All Find Next Close

Book Sheet Name

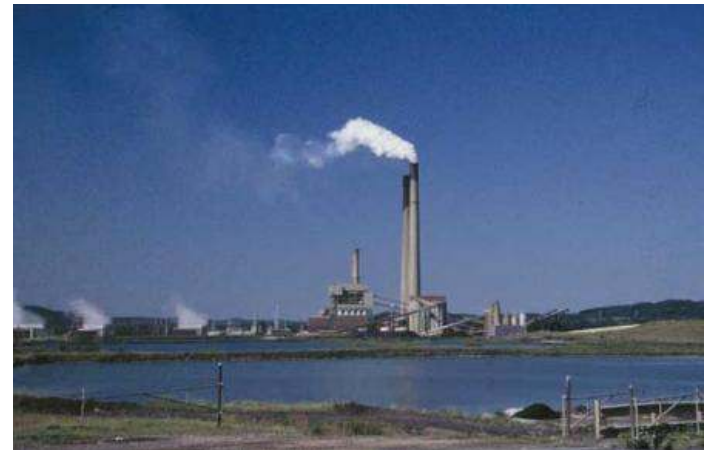
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1 cell(s) found

Average: 733673575.7 Count: 9 Sum: 2201020727 100%

Point Sources

- 100 tons per year (tpy) of any criteria air pollutant excluding lead
- or 5 tpy of lead
- 10 tpy of any single hazardous air pollutant (HAP)
- 25 tpy of a combination of HAPs

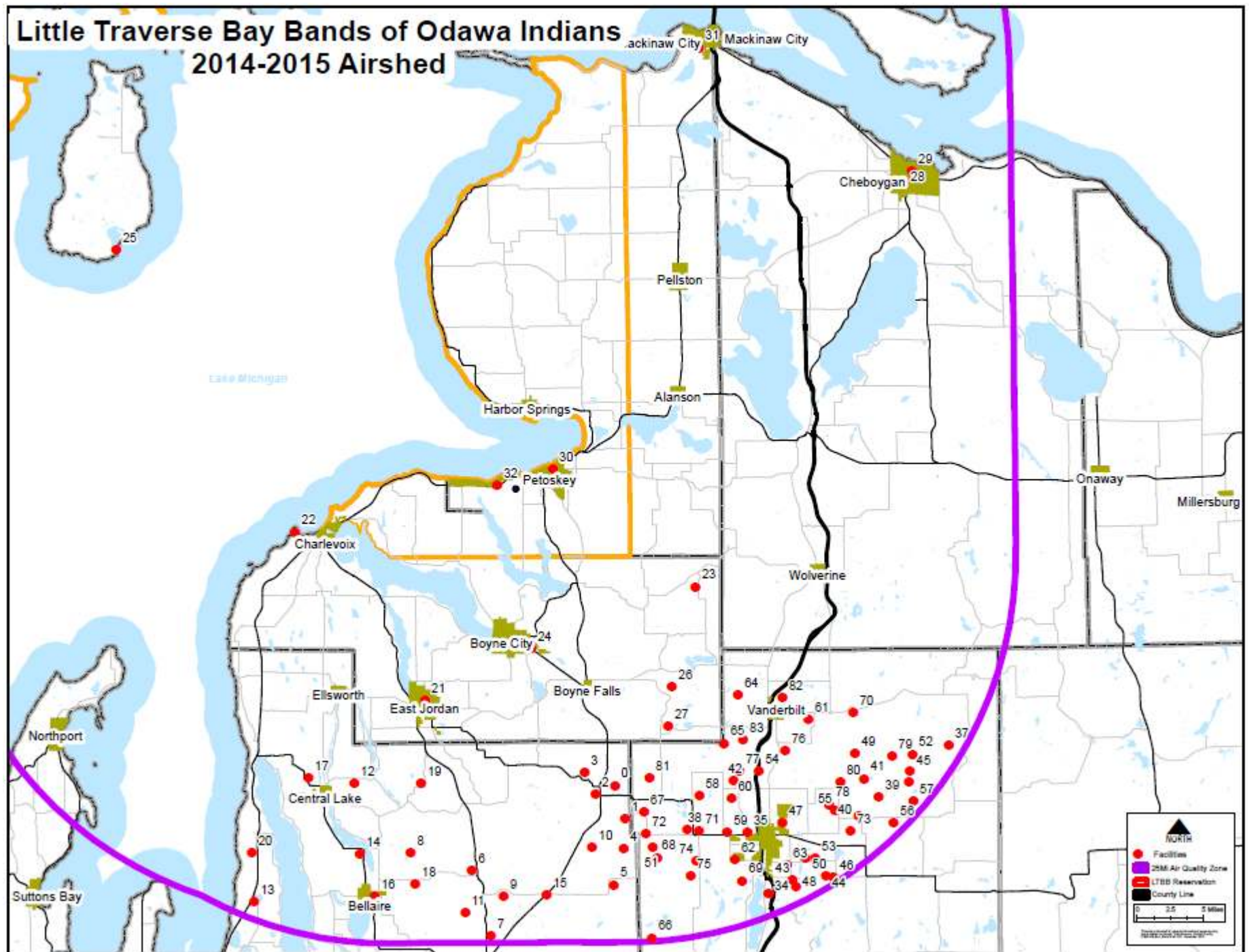


Point Sources Cont.

- Get coordinates to determine which sources are in your area of interest.



Little Traverse Bay Bands of Odawa Indians 2014-2015 Airshed



Area Sources

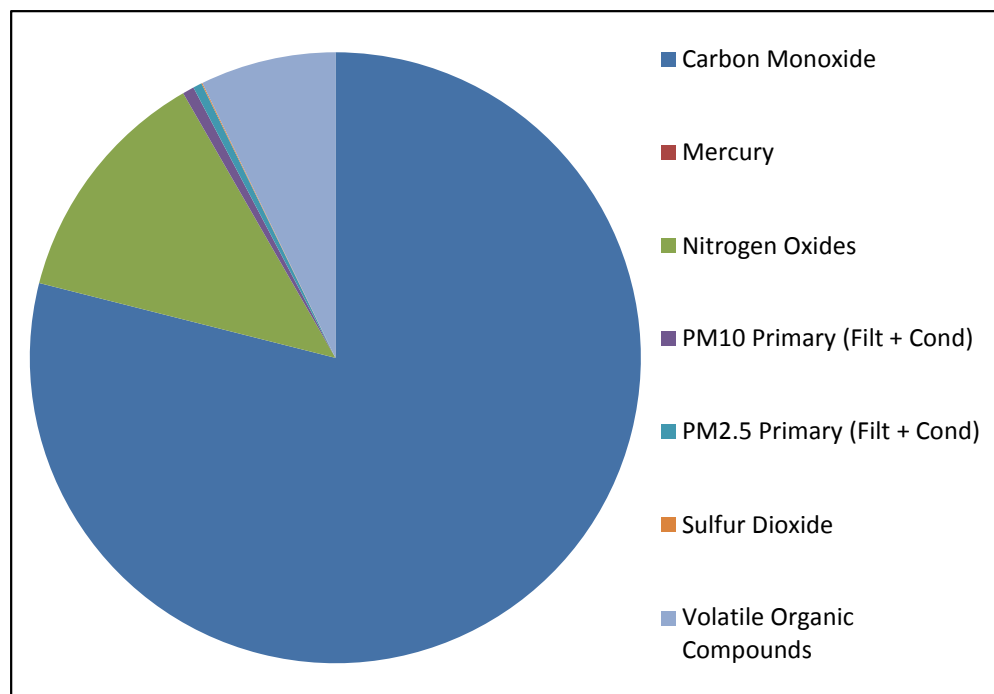
- Groups of similar individual sources spread over a given area (e.g. gas stations).
- They are usually estimated more accurately as a single collective source for a County or Tribal area. In many cases, population or economic data can be used to make estimates (e.g. annual county wide fuel sales).



Mobile Sources (on-road)

- On-road
 - Any vehicles traveling on the highway.
 - Emissions data retrieved from State EI.
 - Emissions were calculated for each county.
 - I worked with GIS to determine the percentage of each county in the Airshed.
 - Tribal Airshed percentages were taken from the total emissions quantities estimated for each county.

County Name	Carbon Dioxide	Carbon Monoxide	Mercury (lbs)	Nitrogen Oxides	PM10 Primary (Filt + Cond)	PM2.5 Primary (Filt + Cond)	Sulfur Dioxide	Volatile Organic Compounds
Antrim	172,940.37	3,449.61	0.055	690.10	43.45	30.65	3.04	330.29
Charlevoix	181,299.67	4,325.56	0.056	742.80	45.98	32.52	3.20	431.75
Cheboygan	134,681.13	3,586.85	0.065	567.86	19.42	16.00	2.47	308.77
Emmet	148,271.21	4,696.69	0.074	576.50	22.00	16.99	2.79	435.12
Leelanau	12,167.47	348.94	0.006	46.68	1.68	1.31	0.23	30.98
Mackinac	75,587.26	1,502.69	0.037	278.81	10.35	8.43	1.38	112.81
Otsego	90,145.13	2,334.74	0.043	348.45	12.52	10.35	1.65	190.47
Schoolcraft	9,215.60	123.20	0.002	38.17	3.12	2.13	0.15	13.14
Airshed Total	824,307.85	20,368.29	0.338	3,289.36	158.52	118.38	14.90	1,853.33



Charts and tables with Airshed totals are useful for the EI report.

Mobile Sources (non-road)

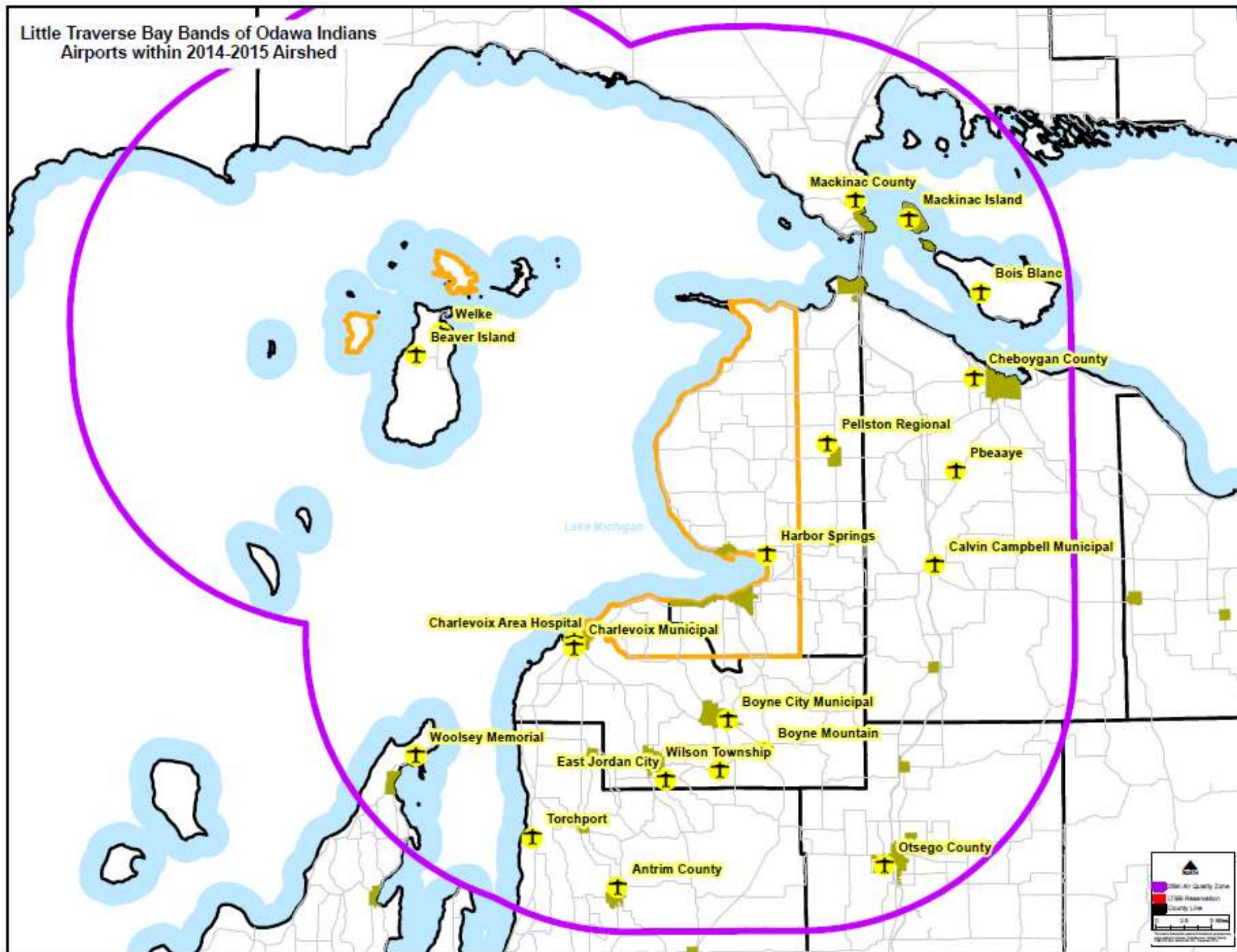
- Non-road
 - Any vehicle or mobile machine used mainly off-road.
 - Non-road emissions data was provided by the Lake Michigan Air Directors Consortium (LADCO).
 - We calculated totals and created separate tables for airport traffic, and recreational and commercial watercraft.
 - Tribal Airshed percentages were taken from the total emissions quantities estimated for each county.



Watercraft

- Our location makes recreational and commercial watercraft emissions particularly significant.
- Over 10,000 acres of inland lake surface area on the Reservation alone.
- Percentages were calculated based on feet of shoreline within the Airshed. Great Lakes and inland lakes with an area over 100 acres were included in this calculation.





Conclusion

- Conducting an EI is a great way for a new air quality specialist to learn about an Airshed's sources.
- Provides a foundation/reference for your air quality work. For example, providing education on the most significant pollutants for the Airshed.
- In our Airshed we generally have good air quality by today's standards. But how much cleaner was the air 300 years ago, before the existence of the sources we inventoried?

A photograph of a sunset over a calm body of water. The sun is a bright, glowing orb on the horizon, partially obscured by a layer of clouds. Its light reflects on the water's surface, creating a shimmering path. The sky is filled with soft, wispy clouds in shades of blue, orange, and yellow. The far shore is a dark silhouette of trees and land. The word "Questions?" is written in a white, sans-serif font in the lower center of the image.

Questions?